Making neurons lose their inhibitions

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CIRM grantees at Sanford-Burnham have just published an interesting paper in *PLoS Biology* about developing a type of neuron that could alleviate symptoms of Huntington's disease, autism, schizophrenia and bipolar disorder - all diseases in which some neurons lose their inhibitions.

First, the big picture. In the brain, some neurons send signals to other neurons, relaying information around the brain. Others simply act to dial up or down those signals. A group of neurons in a part of the brain called the basal ganglia serve to dial back signals from other parts of the brain, basically keeping the signals under control.

In some neurological diseases, it's the loss of those inhibitory neurons that allow signals to run rampant and cause symptoms. In which case, adding some new inhibitory neurons might be what it takes to control symptoms.

What postdoctoral fellow Christina Chatzi knew is that some inhibitory neurons rely on a molecule called retinoic acid in order to develop properly. Retinoic acid is a form of vitamin A that has long been known to aid in developing limbs and body patterning. Working in the lab of Gregg Duester, Chatzi wondered if exposing embryonic stem cells to retinoic acid could result in these inhibitory neurons. Turns out she was right.

Duester's lab studies the basic biology of the role of retinoic acid in development, but they say others may want to follow up on this work in attempt to develop therapies. Sanford-Burnham's excellent blog entry quotes Duester:

> "But what we found here suggests that others could use retinoic acid to make inhibitory neurons to treat disease, just the way an embryo does it naturally."

This work is one great example of how basic biology can feed into the development of new therapies -- something we've blogged about before. Without a constant source of new ideas going into the research pipeline there will be no cures coming out the other end.

CIRM funds two awards to scientists working toward therapies involving inhibitory neurons derived from embryonic stem cells: A comprehensive award to Arnold Kriegstein at the University of California San Francisco, and an Early Translational II award to Arturo Alvarez-Buylla also at UCSF.

- A.A.

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Tags: duester, SEED, chatzi, Autism, schizophrenia, huntinton's disease, Sanford-Burnham, bipolar disorder